



# UNITED STATES PATENT AND TRADEMARK OFFICE

UNITED STATES DEPARTMENT OF COMMERCE  
United States Patent and Trademark Office  
Address: COMMISSIONER FOR PATENTS  
P.O. Box 1450  
Alexandria, Virginia 22313-1450  
www.uspto.gov

APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/027,462	12/21/2001	Leonid Yaroslavsky	10010525-1	1553

7590 11/09/2006

AGILENT TECHNOLOGIES, INC.  
Legal Department, DL429  
Intellectual Property Administration  
P.O. Box 7599  
Loveland, CO 80537-0599

EXAMINER

SETH, MANAV

ART UNIT PAPER NUMBER

2624

DATE MAILED: 11/09/2006

Please find below and/or attached an Office communication concerning this application or proceeding.

<b>Office Action Summary</b>	Application No. 10/027,462	Applicant(s) YAROSLAVSKY ET AL.	
	Examiner Manav Seth	Art Unit 2624	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

### Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

### Status

- 1) ☒ Responsive to communication(s) filed on 01 September 2006.
- 2a) ☒ This action is **FINAL**.                      2b) ☐ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

### Disposition of Claims

- 4) ☒ Claim(s) 1-12 and 14-35 is/are pending in the application.
- 4a) Of the above claim(s) \_\_\_\_\_ is/are withdrawn from consideration.
- 5) ☒ Claim(s) 1-9, 15-30, 34 and 35 is/are allowed.
- 6) ☒ Claim(s) 10-12 and 31-33 is/are rejected.
- 7) ☒ Claim(s) 14 is/are objected to.
- 8) ☐ Claim(s) \_\_\_\_\_ are subject to restriction and/or election requirement.

### Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on \_\_\_\_\_ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.  
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).  
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

### Priority under 35 U.S.C. § 119

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All    b) ☐ Some \*    c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
  2. ☐ Certified copies of the priority documents have been received in Application No. \_\_\_\_\_.
  3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

\* See the attached detailed Office action for a list of the certified copies not received.

### Attachment(s)

- |  |   |
|--|---|
| 1) <input type="checkbox"/> Notice of References Cited (PTO-892)   | 4) <input type="checkbox"/> Interview Summary (PTO-413)<br>Paper No(s)/Mail Date. _____ |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948)                       | 5) <input type="checkbox"/> Notice of Informal Patent Application                       |
| 3) <input type="checkbox"/> Information Disclosure Statement(s) (PTO/SB/08)<br>Paper No(s)/Mail Date _____ | 6) <input type="checkbox"/> Other: _____  |

## DETAILED ACTION

### *Response to Amendment*

1. The amendment received on September 01, 2006 has been entered in full.
2. Applicant's amendment to the claims has been entered and based on the amendments, rejections under 35 USC 102 and 103 on claims 1-9, 15-30 and 34-35 have been withdrawn. Applicant's arguments with respect to rejected claims 10-12 and 31-33 as presented in the amendment filed have been fully considered but are not persuasive.

### *Response to Arguments*

3. Applicant's arguments regarding the prior art rejections under Zwirn on pages 18-20 of the amendment filed on September 01, 2006 have been fully considered but are not persuasive.

Applicant argues in substance in last paragraph of page 19 of 29 of the amendment: "In particular, as was previously discussed by Applicant, "the typical object" recited in claim 10 is representative of class of objects and is separate and distinct from "the object being imaged", as recited therein. At least since Zwirn et al. clearly fail to disclose, explicitly or implicitly, imaging a typical object that is distinguished from an object being imaged, then Zwirn et al. fail to disclose each and every element recited in applicant's claim 10, as presently presented". Examiner respectfully disagrees. In answer, examiner here asserts that claim 10 recites obtaining an optimum focus positioning for only one object and applicant names this one object as typical object which represents a class of objects and inherently any object would represent a class of objects that it

belongs to. Clearly, claim 10 does not recite obtaining an optimum focus positioning using two different objects. Claim 10 has been considered at its own merits since it being an independent claim and therefore claim 10 stand rejected.

Applicant further argues in substance in first paragraph of page 20 of 29 of the amendment: "Regarding base claim 31, Zwirn et al., at least fail to disclose, "a typical object", "a reference image of a typical object" and "an image of the typical object that closely matches the image of the object" as recited in Applicant's Claim 31. Furthermore, Zwirn et al. never disclose or even suggest, "comparing the image of the object to the images in the set of images of the typical object to find a closest matching image" as recited in Applicant's claim 31". Examiner respectfully disagrees. Claim 31 recites " a method of automatically focusing an imaging system on an object comprising one or both of: either (a) using a first focus position or (b) adjusting a second focus position or (c) both". As per the claim part (a) using a first focus position only includes the limitations "using a first focus position corresponding to an image of the object created by the imaging system that has a greatest edge density as an optimum focus position for the imaging system". Therefore, examiner only selected part (a) using first focus position which being the position, which **corresponds to the object created by the imaging system** that has a greatest edge density as an optimum focus position for the imaging system. These limitations have been discussed in the rejection of claim 10, where Zwirn clearly teaches that a focus position with greatest edge density will define the optimum focused position and thus this position if used will optimally focus the imaging system, therefore claim 31 has been similarly analyzed and rejected as per claim 10. Clearly as per the scope of claim 31, other limitations were not required to reject the claim. Therefore claim 31 stand rejected.

Applicant further argues "in office action mailed June 7, 2006, the examiner has inexplicably changed the status of claims 10-12 and 31-33, from allowed to rejected and further changed the

Art Unit: 2624

status claim 14 from allowed to 'objected to but allowable if rewritten' due to its dependency from claim 10. Applicant objects in the strongest terms to this status change on the grounds that the examiner previously had explicitly allowed the aforementioned claims in view of the currently applied art and has offered no justification for the status change'. Examiner here asserts that since the application was still under prosecution, claims in question were carefully reconsidered and analyzed as per reference Zwirn. On reconsideration, it was found that Zwirn did read on the these claims as per the scope of the claims and therefore allowance on these claims 10-14 and 31-33 was withdrawn, and therefore the office action mailed on June 7, 2006 was made as a **non-final action** keeping in view of the rejections made, therefore properly justifying for the status changed on the respective claims.

***Claim Rejections - 35 USC § 102***

4. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless --

(b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

5. Claims 10-12 and 31-33 are rejected under 35 U.S.C. 102(b) as being anticipated by Zwirn et al., U.S. Patent No. 4,789,898.

Regarding claim 10, Zwirn teaches comparing video image signals (control signals), which are related to image characteristics such as edge density to determine an optimum focused image (col. 2, lines 20-45; col. 4, lines 24-40). Zwirn further discloses "The video signal is an

electronic image of the scene under focus" (col. 3, lines 40-41). Zwirn discloses "the present invention relates to the field of automatic focusing systems and more particularly to the field of automatic focusing systems driven by **scene information**" (col. 1, lines 5-10), particularly information relating to the high frequency spectral (edge) density of the scene (col. 1, lines 54-58), where it is apparent that a **scene could be an object focused by an imaging system**. Zwirn further discloses determining an optimum focus position by adjusting the focus position towards the focus position where the high frequency content increases thereby increasing the sharpness of the focus (optimum focus) (col. 1, lines 62-65; col. 2, lines 1-10, lines 41-45, col. 3, lines 50-60; col. 4, lines 35-39).

Zwirn further discloses "As the video information gathering device is brought into focus the high frequency content of the video signal will increase. By passing the video signal through a band pass filter and then processing it in a conditional integrator, a control signal is generated whose amplitude contains information relating to the degree of focus. The control signal is stored and later compared to a control signal derived from a subsequent scanning. Once a significant change in control signal levels is detected a drive signal is sent to the focusing device. If after being driven the subsequent scene has less high frequency (edge density) content, the a drive signal in the opposite polarity or direction is sent to the focusing device. In this manner the scene is toggled into focus only when the scene is initially defocused" (col. 1, lines 62-68 through col. 2, lines 1-10). It is clear from the above disclosure by Zwirn that a control signal which is a measure of edge density (high frequency components) of each scan (or image) of the scene (or object) at each different focus is computed and then according to the focus or scan position that has the greatest edge density (high frequency components) the optimum focus position is determined and thus a set of images (scans) of the scene are evaluated using edge density, thus Zwirn teaches comparing images with respect to

edge density to automatically obtain optimum image focus position and thus selecting or using the optimum focus position as highly focused position to focus the imaging system optimally. The claim only recites naming the optimum position as reference focus position without providing any other specifics in the claim 10 for what purpose it is being used and therefore it is assumed to be a choice of the inventor to name such position as a reference focus position.

**Claim 11** recites “the method of claim 10, wherein the computed edge density is a relative measure of edges in each of the images”. As discussed in the rejection of claims 1 and 2, Zwirn discloses the computed high frequency spectral (edge) density of the scene (object) is measured by measuring high frequency components (edges) in each of the images. Therefore, claim 11 has been similarly analyzed and rejected as per claims 10, 1-2.

**Claim 12** recites “The method of claim 10, wherein the edge density is computed using an edge density metric employing one of any gradient-based and any non-gradient-based edge detection and image processing methods”. As discussed in the rejection of claim 2, the video signal is passed through the band pass filter 15 to determine the degree of focus (edge density). Therefore, claim 12 has been similarly analyzed and rejected as per claims 10, 1-2 and 11.

**Regarding claim 31**, claim 31 recites “ a method of automatically focusing an imaging system on an object comprising one or both of: either using a first focus position or adjusting a second focus position or both”. Therefore, examiner selects using first focus position which being the position, which **corresponds to the object created by the imaging system** that has a greatest edge density as an optimum focus position for the imaging system. These limitations have discussed

Art Unit: 2624

in the rejection of claim 10, where Zwirn clearly teaches that a focus position with greatest edge density will define the optimum focused position and thus this position if used will optimally focus the imaging system, therefore claim 31 has been similarly analyzed and rejected as per claim 10.

Claims 32 and 33 has been similarly analyzed and rejected as per claims 10-12, and 31.

*Allowable Subject Matter*

**Reasons of Allowance:**

6. Claims 1-9, 15-30 and 34-35 are allowed.

The following is an examiner's statement of reasons of allowance:

The instant invention relates to a method of determining a change in focus position of an imaging system. The prior art of record (Kitamura, U.S. Patent No. 5,369,430) does teach obtaining the optimal focused image by comparison between an image of a typical object and an image of the object created by the imaging system but does not teach "adjusting a second focus position corresponding to an image of the object by a difference between focus positions for a reference image of a typical object and an image of the typical object that closely matches the image of the object, where the first focus position corresponds to a reference image of a typical object, the second focus position corresponding to an image of the typical object that closely matches the image of the object" as recited in claims 5, 34 and 35. Therefore claims 5, 34 and 35 are allowed and all other claims depending on claims 5, 34 and 35 are allowed at least by dependency on claims 5, 34 and 35.



The invention method further comprises comparing the image of the second object to the images in the set of images of the first object to find a closest matching image, the closest matching image from the set having an associated third focus position; and determining a change in the second focus position to provide an optimum focus position for imaging the second object with the imaging system where the object being representative of a class of objects. These features in combination with the other elements of the claim 15 are not disclosed or suggested by the prior art of record. Therefore claim 15 is allowed and all other claims depending on claim 15 are allowed at least by dependency on claim 15. The instant invention further recites the limitation "wherein the typical object image is one image of a plurality of typical object images in a set, each image in the set being associated with a different focus position" in claims 1, 21 and 26, which is not taught by the prior art of record. Therefore, claims 1, 21 and 26 are allowed and all other claims depending on claims 1, 21 and 26 are allowed at least by dependency on claims 1, 21 and 26.

7. Claim 14 is objected to as being dependent upon a rejected base claim but would be allowable if rewritten in independent form including all of the limitations of the base claim and any intervening claims.

The following is an examiner's statement of reasons of allowance:

The same reasons of allowance are applied to claim 14 as applied to claim 15.

Any comments considered necessary by applicant must be submitted no later than the payment of the issue fee and, to avoid processing delays, should preferably accompany the issue fee. Such submissions should be clearly labeled "Comments on Statement of Reasons for Allowance."

*Conclusion*

8. **THIS ACTION IS MADE FINAL.** See MPEP § 706.07(a). Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

A shortened statutory period for reply to this final action is set to expire THREE MONTHS from the mailing date of this action. In the event a first reply is filed within TWO MONTHS of the mailing date of this final action and the advisory action is not mailed until after the end of the THREE-MONTH shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event, however, will the statutory period for reply expire later than SIX MONTHS from the date of this final action.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Manav Seth whose telephone number is (571) 272-7456. The examiner can normally be reached on Monday to Friday from 8:30 am to 5:00 pm.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Bhavesh Mehta, can be reached on (571) 272-7453. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished

Art Unit: 2624

applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).

Manav Seth  
Art Unit 2624  
November 7, 2006

  
**BHAVESH M. MEHTA**  
**SUPERVISORY PATENT EXAMINER**  
**TECHNOLOGY CENTER 2600**